

1. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{8x^3 - 38x^2 + 15x + 36}{12x^2 + 29x + 15}$$

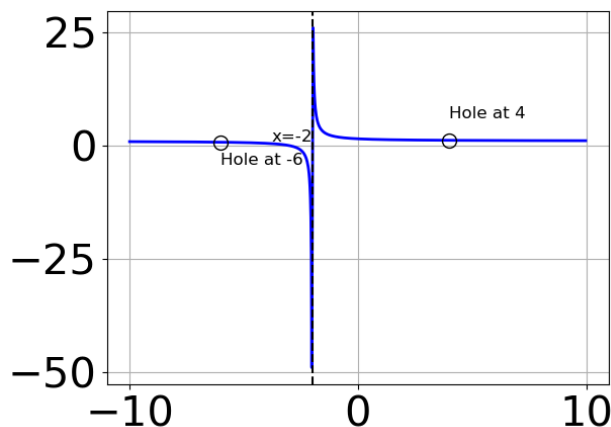
- A. Vertical Asymptote of  $x = 0.667$  and hole at  $x = -0.75$
  - B. Vertical Asymptotes of  $x = -1.667$  and  $x = 1.5$  with a hole at  $x = -0.75$
  - C. Vertical Asymptote of  $x = -1.667$  and hole at  $x = -0.75$
  - D. Holes at  $x = -1.667$  and  $x = -0.75$  with no vertical asymptotes.
  - E. Vertical Asymptotes of  $x = -1.667$  and  $x = -0.75$  with no holes.
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2. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{6x^3 - 35x^2 + 63x - 36}{6x^2 + 7x - 20}$$

- A. Vertical Asymptotes of  $x = -2.5$  and  $x = 1.333$  with no holes.
  - B. Vertical Asymptote of  $x = 1.0$  and hole at  $x = 1.333$
  - C. Vertical Asymptote of  $x = -2.5$  and hole at  $x = 1.333$
  - D. Holes at  $x = -2.5$  and  $x = 1.333$  with no vertical asymptotes.
  - E. Vertical Asymptotes of  $x = -2.5$  and  $x = 1.5$  with a hole at  $x = 1.333$
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3. Which of the following functions *could* be the graph below?



- A.  $f(x) = \frac{x^3 + 8.0x^2 - 3.0x - 90.0}{x^3 - 4.0x^2 - 20.0x + 48.0}$
- B.  $f(x) = \frac{x^3 - 6.0x^2 - 9.0x + 54.0}{x^3 + 4.0x^2 - 20.0x - 48.0}$
- C.  $f(x) = \frac{x^3 + 5.0x^2 - 18.0x - 72.0}{x^3 + 4.0x^2 - 20.0x - 48.0}$
- D.  $f(x) = \frac{x^3 - 5.0x^2 - 18.0x + 72.0}{x^3 - 4.0x^2 - 20.0x + 48.0}$
- E. None of the above are possible equations for the graph.

4. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{9x^3 - 12x^2 - 20x + 16}{9x^2 - 21x + 10}$$

- A. Vertical Asymptote of  $x = 1.0$  and hole at  $x = 0.667$
- B. Vertical Asymptotes of  $x = 1.667$  and  $x = -1.333$  with a hole at  $x = 0.667$
- C. Vertical Asymptote of  $x = 1.667$  and hole at  $x = 0.667$
- D. Holes at  $x = 1.667$  and  $x = 0.667$  with no vertical asymptotes.
- E. Vertical Asymptotes of  $x = 1.667$  and  $x = 0.667$  with no holes.

5. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{12x^3 + 71x^2 + 130x + 75}{4x^2 - 11x - 20}$$

- A. Horizontal Asymptote at  $y = 4.0$
  - B. Oblique Asymptote of  $y = 3x + 26$ .
  - C. Horizontal Asymptote of  $y = 3.0$  and Oblique Asymptote of  $y = 3x + 26$
  - D. Horizontal Asymptote of  $y = 3.0$
  - E. Horizontal Asymptote of  $y = 4.0$  and Oblique Asymptote of  $y = 3x + 26$
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6. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{5x^2 + 24x + 16}{20x^3 + 31x^2 - 38x - 40}$$

- A. Horizontal Asymptote at  $y = -4.000$
  - B. Horizontal Asymptote of  $y = 0$
  - C. Oblique Asymptote of  $y = 4x - 13$ .
  - D. Horizontal Asymptote of  $y = 0.250$  and Oblique Asymptote of  $y = 4x - 13$
  - E. Horizontal Asymptote of  $y = 0.250$
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7. Determine the vertical asymptotes and holes in the rational function below.

$$f(x) = \frac{12x^3 - 5x^2 - 17x + 10}{12x^2 - 17x + 6}$$

- A. Vertical Asymptote of  $x = 1.0$  and hole at  $x = 0.667$
- B. Vertical Asymptotes of  $x = 0.75$  and  $x = 0.667$  with no holes.

- C. Vertical Asymptote of  $x = 0.75$  and hole at  $x = 0.667$
  - D. Vertical Asymptotes of  $x = 0.75$  and  $x = -1.25$  with a hole at  $x = 0.667$
  - E. Holes at  $x = 0.75$  and  $x = 0.667$  with no vertical asymptotes.
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8. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{16x^3 - 16x^2 - 9x + 9}{4x^2 - 9x - 9}$$

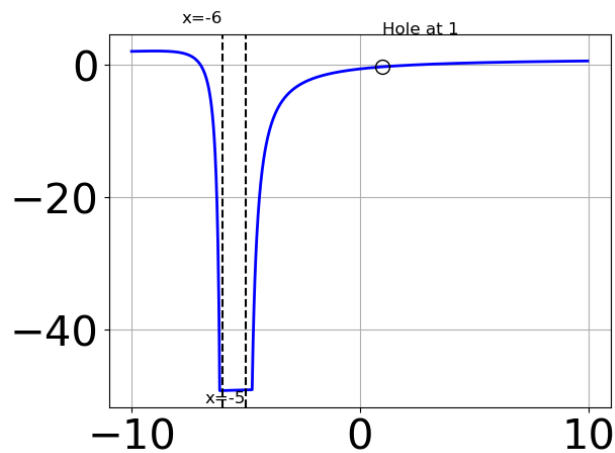
- A. Oblique Asymptote of  $y = 4x + 5$ .
  - B. Horizontal Asymptote of  $y = 4.0$
  - C. Horizontal Asymptote at  $y = 3.0$
  - D. Horizontal Asymptote of  $y = 3.0$  and Oblique Asymptote of  $y = 4x + 5$
  - E. Horizontal Asymptote of  $y = 4.0$  and Oblique Asymptote of  $y = 4x + 5$
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9. Determine the horizontal and/or oblique asymptotes in the rational function below.

$$f(x) = \frac{8x^3 + 42x^2 + 67x + 30}{8x^3 + 50x^2 + 85x + 50}$$

- A. Vertical Asymptote of  $y = -2$
  - B. Horizontal Asymptote of  $y = 0$
  - C. Vertical Asymptote of  $y = -1.250$
  - D. Horizontal Asymptote of  $y = 1.000$
  - E. None of the above
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10. Which of the following functions *could* be the graph below?



A.  $f(x) = \frac{x^3 - 3.0x^2 - 25.0x - 21.0}{x^3 - 10.0x^2 + 19.0x + 30.0}$

B.  $f(x) = \frac{x^3 + 2.0x^2 - 29.0x + 42.0}{x^3 + 10.0x^2 + 19.0x - 30.0}$

C.  $f(x) = \frac{x^3 + 3.0x^2 - 25.0x + 21.0}{x^3 + 10.0x^2 + 19.0x - 30.0}$

D.  $f(x) = \frac{x^3 - 7.0x^2 - 9.0x + 63.0}{x^3 - 10.0x^2 + 19.0x + 30.0}$

E. None of the above are possible equations for the graph.

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